Expediting the 17-mile LPRSA RI/FS & Upper 9-mile Remedial Action

August 17, 2017

623524

Overview

- Shared Objectives in Expediting Completion of RI/FS
- Completing the 17-mile LPRSA RI Report
- Refocusing the FS to Upper 9-miles
- Summary of the Upper 9-mile Plan
- How the Phase 1 Remedy Fits into the Full Program
- Upper 9-mile Plan's Consistency with:
  - December 2005 Sediment Guidance
  - January 2017 OLEM Directive
  - July 2017 Superfund Task Force Recommendations
- Responses to EPA's July 24, 2017 Questions
- Next Steps

EPA & CPG Share a Goal of Expeditiously Completing the RI/FS

- All RI Sampling is Complete – No New Information is Being Collected
  - We understand the physical, chemical and biological conditions to the extent possible
  - Uncertainties exist, but won't be resolved by more data analysis
  - Decision-relevant uncertainties **(**such as sediment stability, sediment/fish tissue relationships**,** and contaminant fate and transport**)** can only be resolved using the adaptive management process
- Under Current Process, RI/FS will not be Completed until 2021 at the earliest
  - No Upper 9-mile ROD until 2023 or later
  - Upper 9-mile RD begins in 2024 or later
  - Upper 9-mile RA - TBD
- Under Current Schedule, Remedy is far in future
  - Not in the best interest of EPA or CPG
- Lower 8 Mile Remedy has been Selected
  - Protecting the cap from recontamination is important
  - Coordination with Lower 8-mile Remedial Action is desirable

Collective Benefits of Quickly Completing the RI/FS

- Upper 9-Mile ROD, RD and RA all occur earlier
  - Supports W. Mugdan's goal of a complete 17-mile RI/FS in ~2 years
  - Resources and time can be focused on remediation rather than unnecessary additional evaluations
- Reduces Risks Earlier and Accelerates Recovery in Upper 9-miles
- Allows Coordination with OCC/GSH on Common RD Elements, Minimizes Conflicting Design Elements
  - Sediment processing facility
  - Sediment transport and disposal Facilities
  - Baseline monitoring
  - Resuspension controls
  - Post remediation monitoring
- Protects Lower 8 Mile Remedy
  - More rapid RI/FS completion means RA sooner in Upper 9, lessens potential for recontamination in Lower 8
- Remedy Performance Monitoring Provides Adaptive Basis for Consideration of Potential Future Action

Rapidly completing the RI/FS will expedite the RD/RA for the Upper 9 miles and increase the likelihood of a successful overall remedy for the entire 17-mile LPRSA

RI/FS Strategy for ROD 1 in 2019

Key Provisions of Approach

- Revised RI report to be submitted in December 2017 is sufficient to support ROD 1
  - Additional review and comment cycles will not resolve differences that are based on uncertainties
  - Areas of uncertainty should be identified for evaluation throughout the adaptive management process
- FS focused on sediments likely inhibiting recovery as identified based on:
  - Surface sediment COPC concentrations throughout the Upper 9 miles
  - Sub-surface sediment COPC concentrations in areas vulnerable to erosion
  - Understanding that fine sediments typically have higher concentrations (consistent with lower 8 ROD)
  - Background and water column concentrations
- Adaptive Management program that will provide scientific answers to areas of uncertainty
  - Goals for baseline monitoring, post remediation monitoring, and triggers for potential future actions

Steps to an Expedited 17-mile RI/FS Schedule

Remedial Investigation

- Acknowledge Uncertainties in 17-Mile RI and Address in Performance Monitoring Program
  - COC Mapping
  - Contaminant Fate & Transport
  - Sediment and Tissue Interactions
  - Sediment Stability
  - Modeling
  - Risk Reductions
- Focus RI Report comment resolution on Decision-Relevant Issues
- Calibrate the Chemical Fate and Transport (CFT) for 2,3,7,8-TCDD and Tetra-PCB and the Food Web model as part of the RI
- Deliver Revised RI Report in December 2017

Steps to an Expedited 17-mile RI/FS Schedule

Feasibility Study

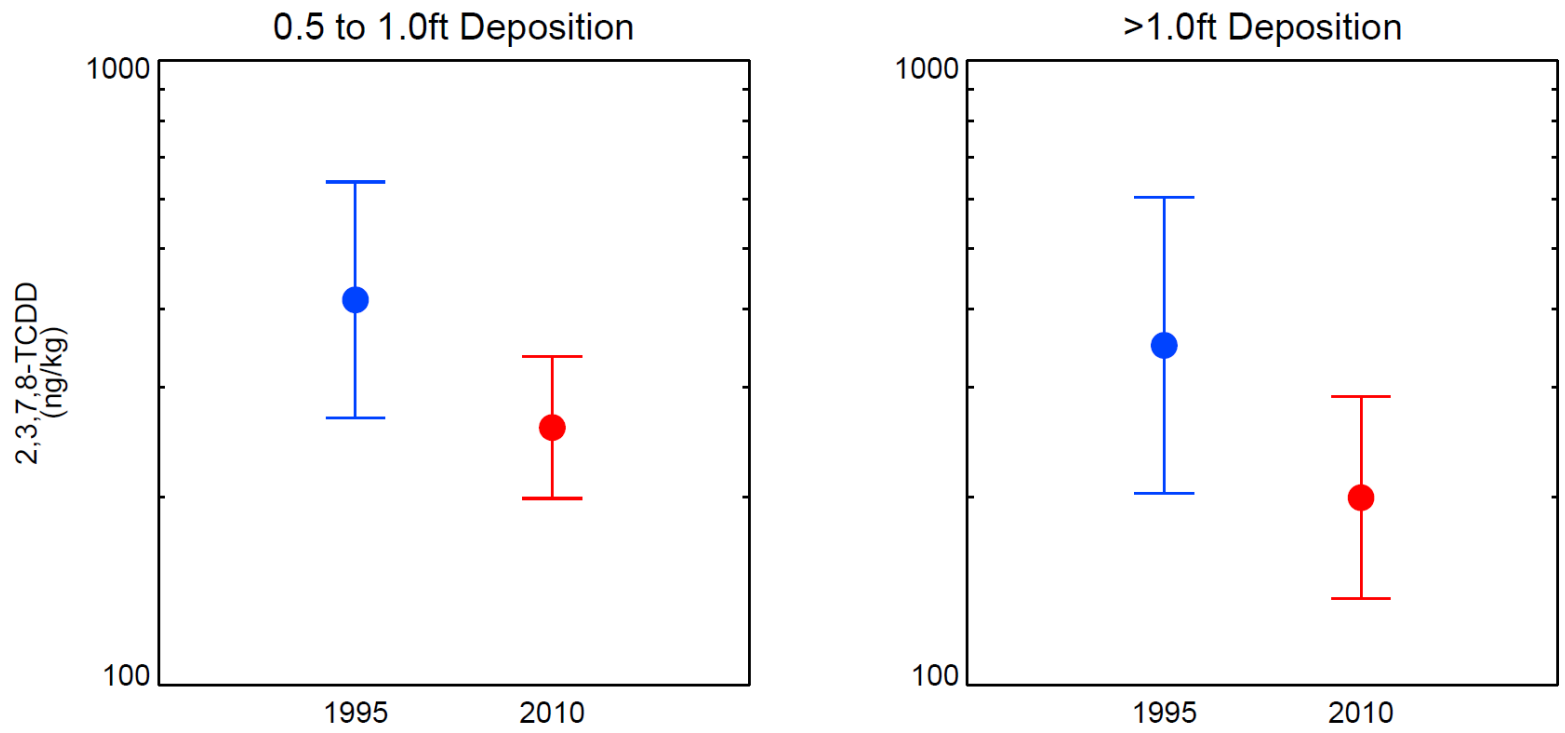
- Focus the FS Scope on the Upper 9-miles
  - Lower 8-mile Remedy has been selected
  - Focus FS activities on decision-relevant topics
- Agree on scope of AOC FS Technical Memoranda
- Agree on FS Scope and Content Incorporating Adaptive Management Concepts
  - Evaluate No Action and a Targeted Removal Alternative
  - Lower 8-mile Remedy will be assumed
  - Potential for future action will be clearly identified based on post-remediation Performance Monitoring
  - Evaluate need for Subsequent Actions using Multiple RODs
- Develop Detailed Outline of ROD 1 FS in Q4 2017
  - Agreement on Upper 9-mile RAOs
  - Agreement on Modeling in Support of the Upper 9-mile FS
  - Identification of ROD 1 Remedial Action Areas
  - Estimates of TCDD/PCB concentration reductions
  - Framework for Adaptive Management milestones and responses
  - Identify Performance Monitoring Components to Evaluate Uncertainties Remaining in RI
- Maintain Firm Schedule for FS status meetings with EPA
- Complete FS by End of 2018

Upper 9-mile Plan – RI/FS Schedule

	2017						2018											
RI/FS Submittals to EPA	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
BHHRA	■																	
BERA					■													
RI Report						■												
RAO Memo			■															
Technology Screening Memo			■															
Remedial Alternatives Memo				■														
Draft FS												■						
Final FS																		■

Upper 9-mile Plan Phase 1 Remedy - Basis

- ROD 1 will actively remediate sediments in upper 9 miles that inhibit recovery, as evidenced by:
  - Having surface concentrations greater than found in the water column, or
  - Having the potential via erosion to expose subsurface concentrations greater than those found in the water column
- Conservative RALs of 300 ppt for 2,3,7,8-TCDD and/or 1 ppm of Total PCBs are proposed (data supports 400 ppt and 1.5 ppm)
- Resulting remediation footprint will address more than 30% of the sediment in the region between RM 8 and RM 12.3.
- Final remedial area boundaries will be established in the PDI & RD



Plot shows the arithmetic average calculated in natural log space with +/- two standard errors for data collected between RM 1 and RM 7. The 1995 dataset includes data collected between 1995 – 1999 and the 2010 dataset includes data collected between 2005 – 2013. Differences between 1995 and 2011 bathymetry surveys were used where available. Outside the coverage of the 2011 bathymetry data, differences between 1995 and 2007 bathymetry surveys were used.

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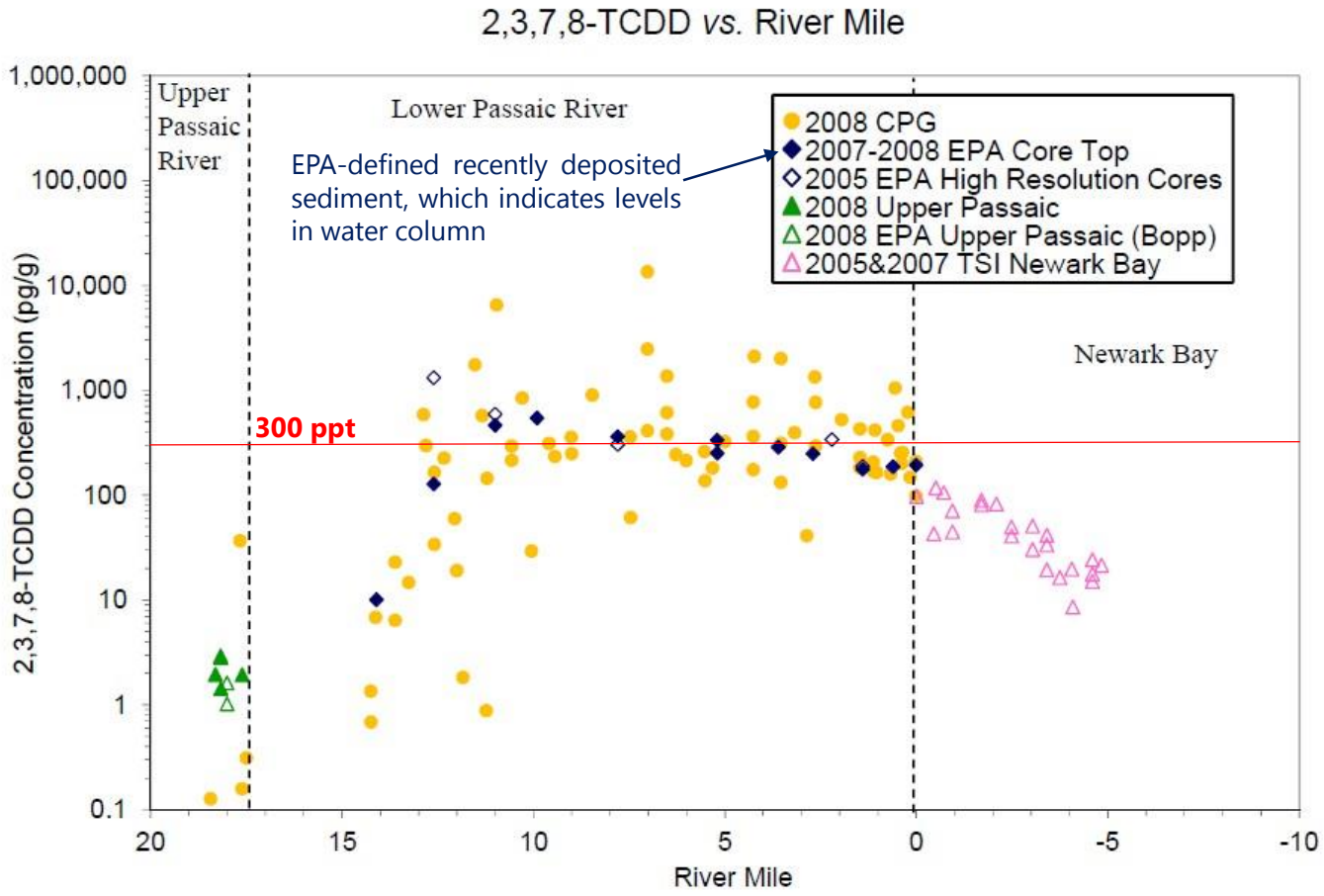
ANCHOR QEA

Figure 1

Change in Average Surface Sediment 2,3,7,8-TCDD Concentration in Areas Between RM 1 and RM 7 That Experienced Net Deposition Between 1995 & 2011



"…2,3,7,8-TCDD concentration in recently-deposited sediments vary less than a factor of 3 from RM 2 to RM 12 (note in blue diamonds on the upper diagram in Figure 4-3)." – FFS RI Report at Page 4-3.

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Figure 2
2,3,7,8-TCDD Concentration in Recently-Deposited Sediments in the Lower Passaic River, Newark Bay and the Upper Passaic River (Extracted from FFS RI Report Figure 4-3)

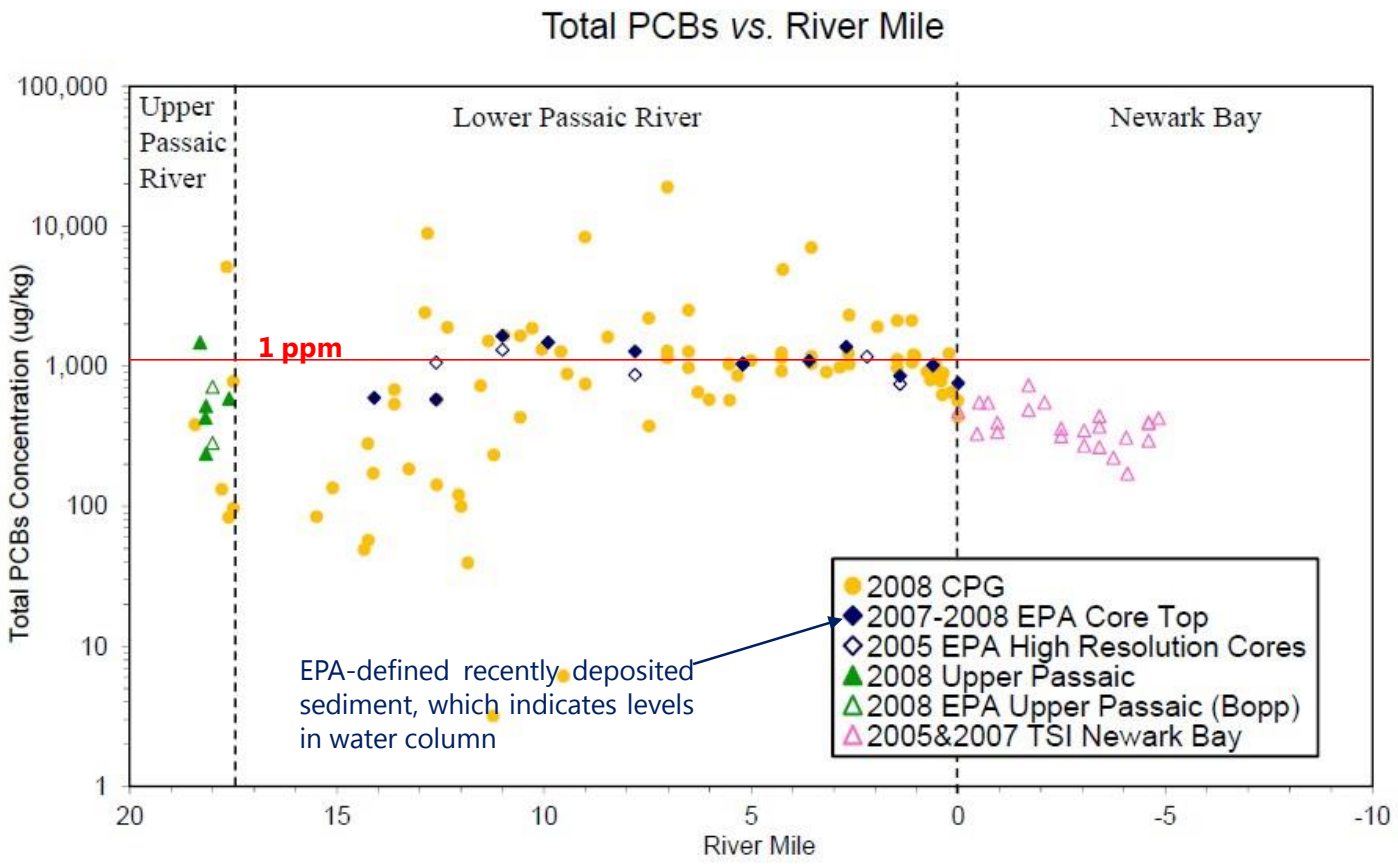

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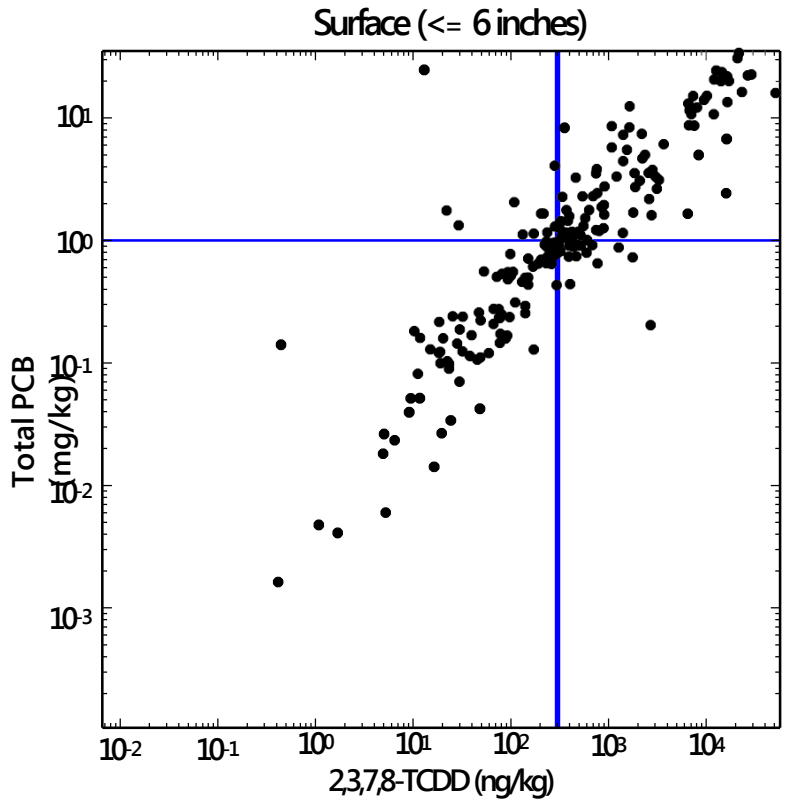
Figure 3
Total PCBs in Recently-Deposited Sediments in the Lower Passaic River, Newark Bay and the Upper Passaic River (Extracted from FFS RI Report Figure 4-12)



Post 2005 data used. Surface is a depth 6 inches or less

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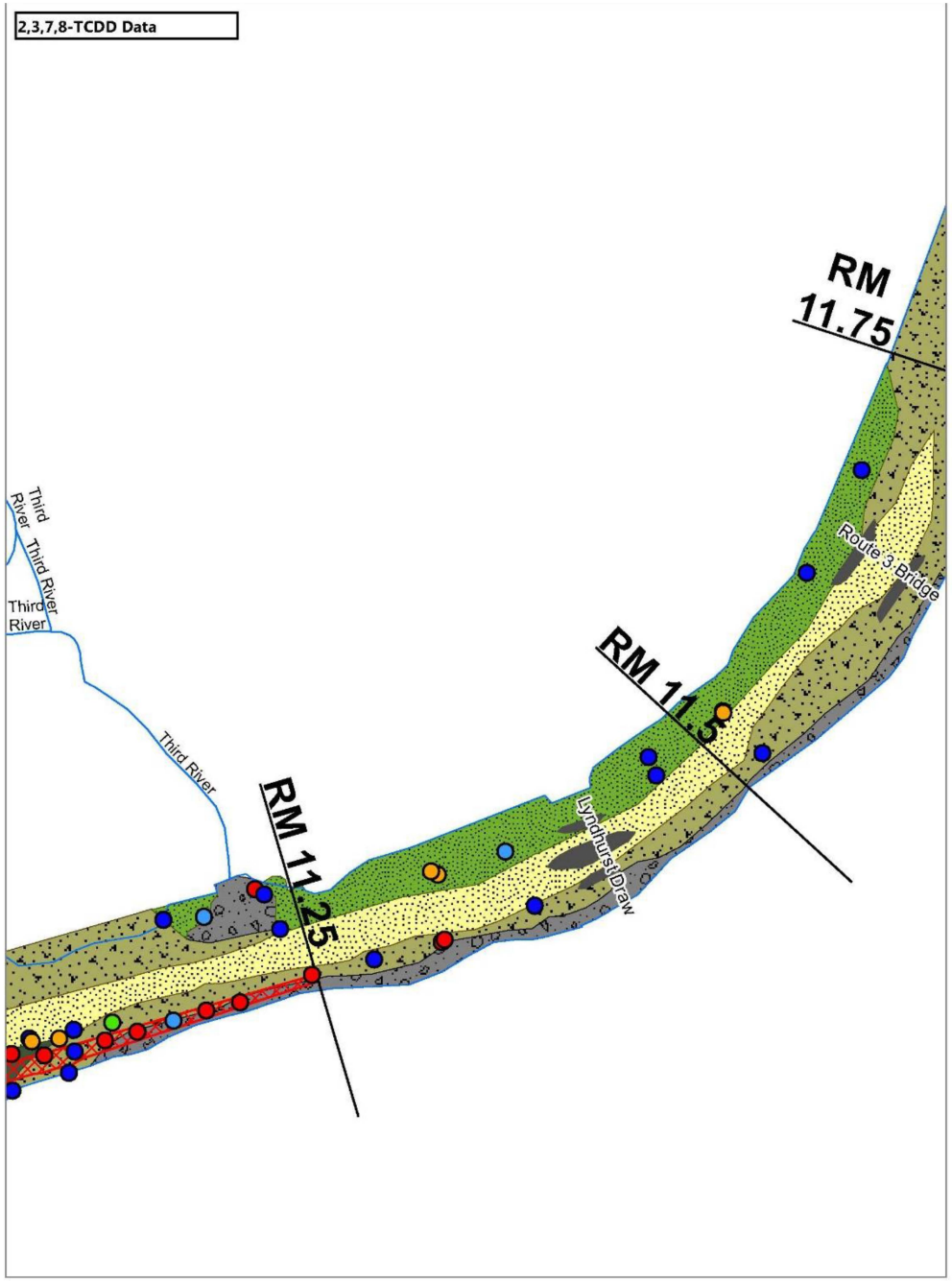
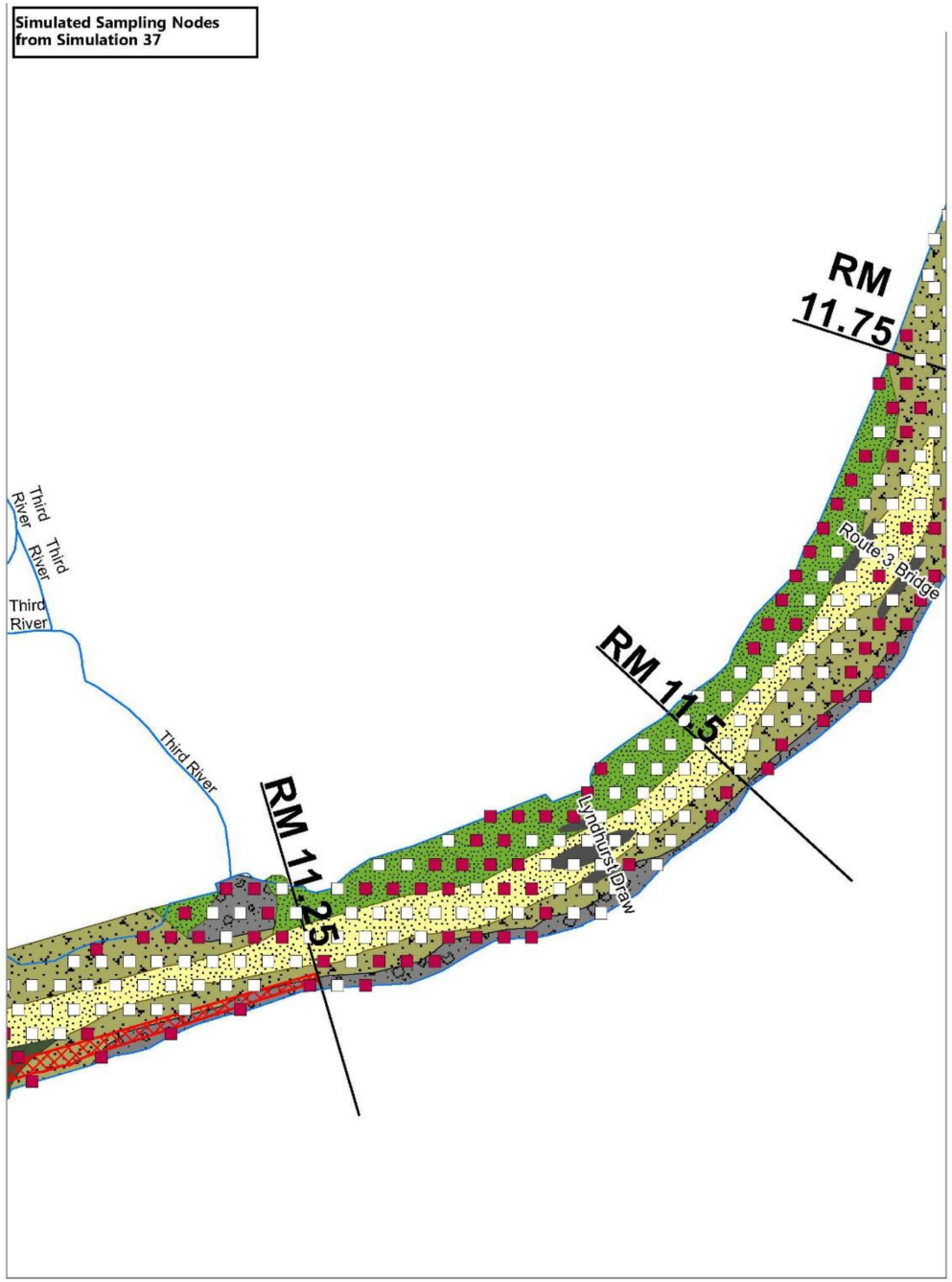
Figure 4
Correlation of Paired Total PCB and 2,3,7,8-TCDD Concentrations in Surface Sediments Between River Miles: RM 12.3 and 8





LEGEND:

2,3,7,8-TCDD Concentration (ng/kg)

- 0 - 200
- 201 - 300
- 301 - 400
- 401 - 500
- 501 - 1000
- 1001 - 51100

Simulated Nodes

- below RAL
- above RAL
- RM10.9 Removal Area

SSS Sediment Types

- Rock and Coarse Gravel
- Gravel and Sand
- Sand
- Silt and Sand
- Silt

NOTES:

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k20160909_RI_draft2
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v6_gauss_ex2\a5_lg_grid\

Areas targeted are at least 300 ng/kg for 2,3,7,8-TCDD or at least 0.28 ppm for tetra-CB

0 300 600
Feet

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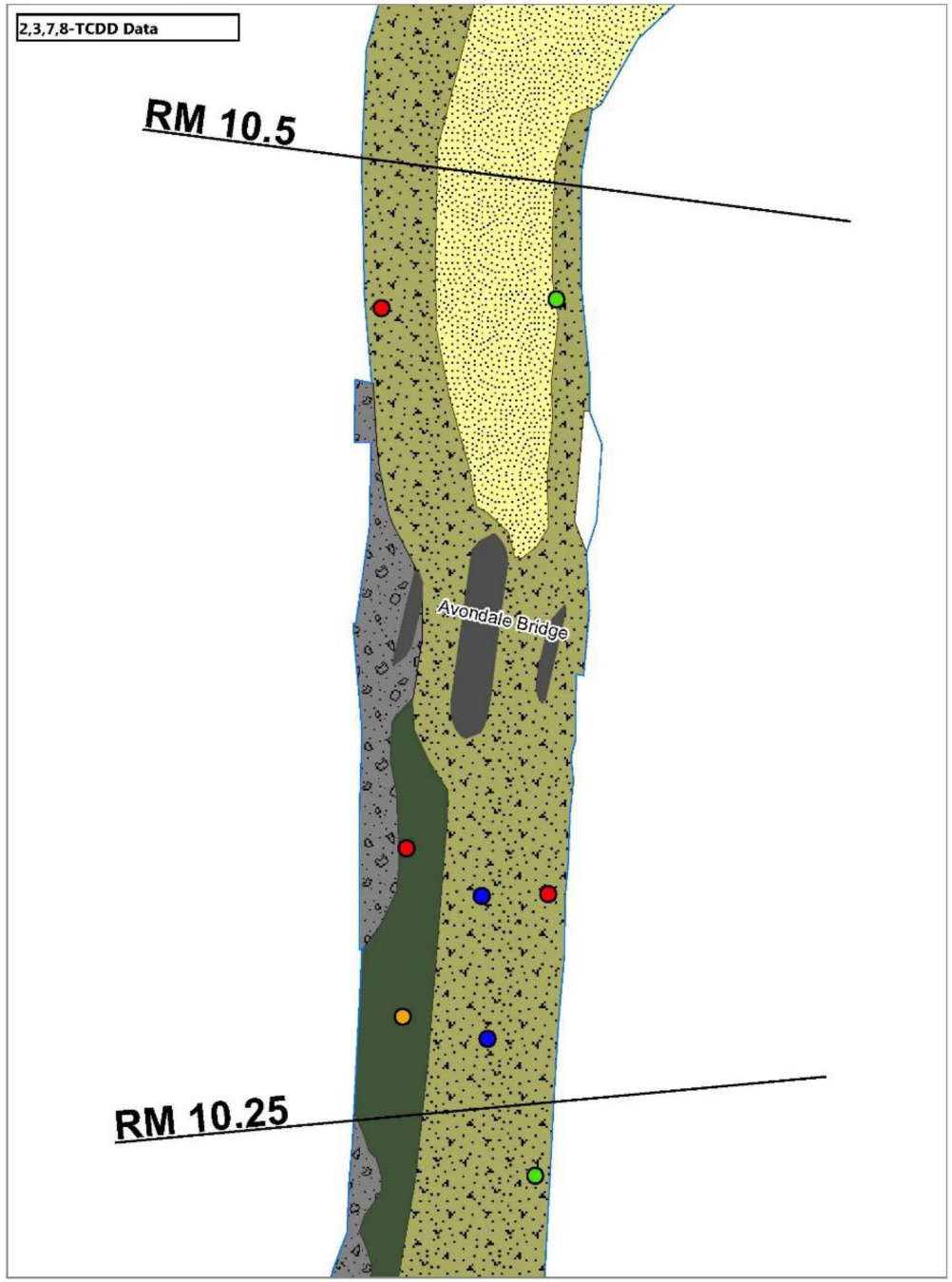

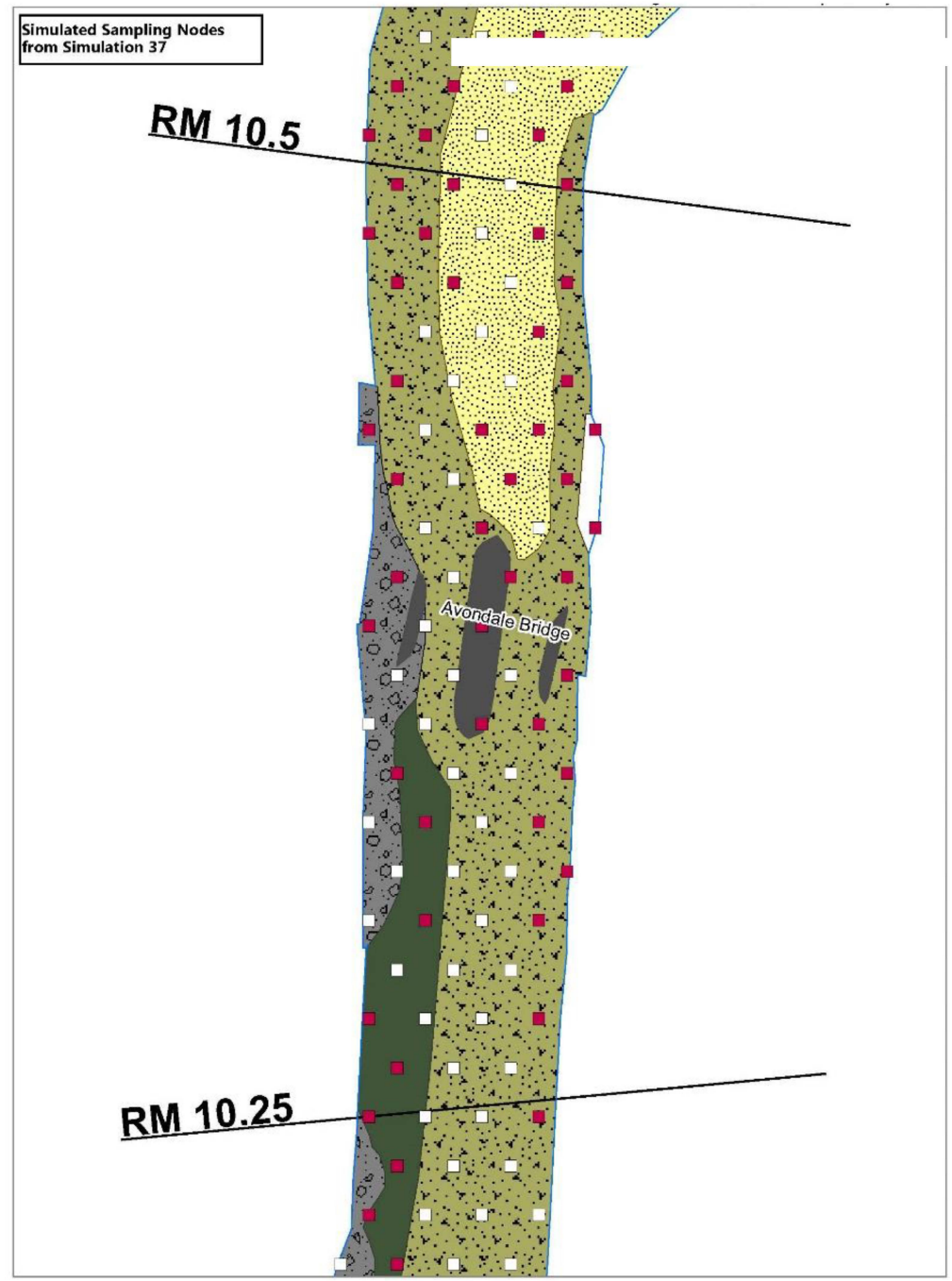

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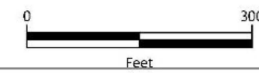

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Role of Models in Upper 9-Mile FS

- Evaluate recontamination of remediated areas, including impacts of external sources
- Guide pre-design data collection for the purpose of achieving sufficient model reliability to set expectations for post-remediation recovery
- Address uncertainty of FS model recovery trends for the upper 9 miles due to key data gaps and skill limitations:
  - No long-term trend data for comprehensive calibration
  - Limited upstream boundary solids COPC concentrations (currently based on a handful of samples)
  - Limited ability of the sediment transport model to reproduce cell-by-cell net deposition and net erosion
  - Uncertainty in food web exposure pathways

Role of Models in Upper 9-Mile Post-ROD

- Refine Models using PDI and baseline investigations
- Conduct projection runs with finalized remedy footprint to develop expected recovery trajectories
- Compare model trajectories and performance monitoring data
- If significantly different:
  - Recalibrate models
  - Consider additional remediation If the data and models indicate need

Phase 1 Will Provide Substantial Reduction of Risks

Phase 1 Remedial Action would address RAOs identified by USEPA for the Upper 9-miles and would provide tangible and substantial reductions in risk to Human Health and the Environment:

- Remediation of TCDD levels between 50,000 and 300 ppt, Total PCBs between 10,000 and 1 ppm and other COCs will significantly reduce bio-uptake and resulting risk to humans, fish and other wildlife.
- Reduce direct contact risks in intertidal areas for people who use the river
- Reduces ecological risks and improve habitat
  - Areas to be addressed include intertidal sediment where benthic organisms and forage fish live along with birds and wildlife.

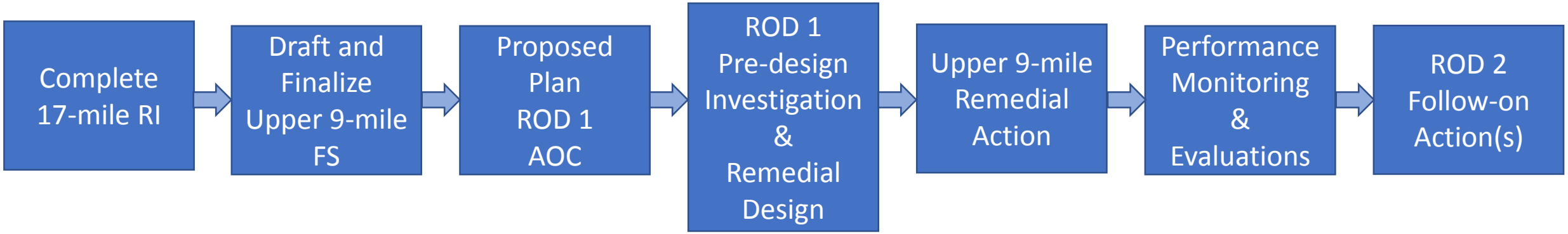
Adaptive Management in the Upper 9-mile Plan

- Recognize and accept uncertainty with a plan to phase the remedy as part of an adaptive management process
- Employ an adaptive multi-ROD approach to accelerate and provide effective remedial action in the Upper 9-miles
- Identify and address uncertainties as data becomes available during Pre-Design, Baseline and Performance Monitoring
- Use modeling to help evaluate uncertainty and interpret Performance Monitoring data
- Establish clear goals for ROD 1 and steps needed to determine scope for ROD 2

Assessing the Effectiveness of ROD 1

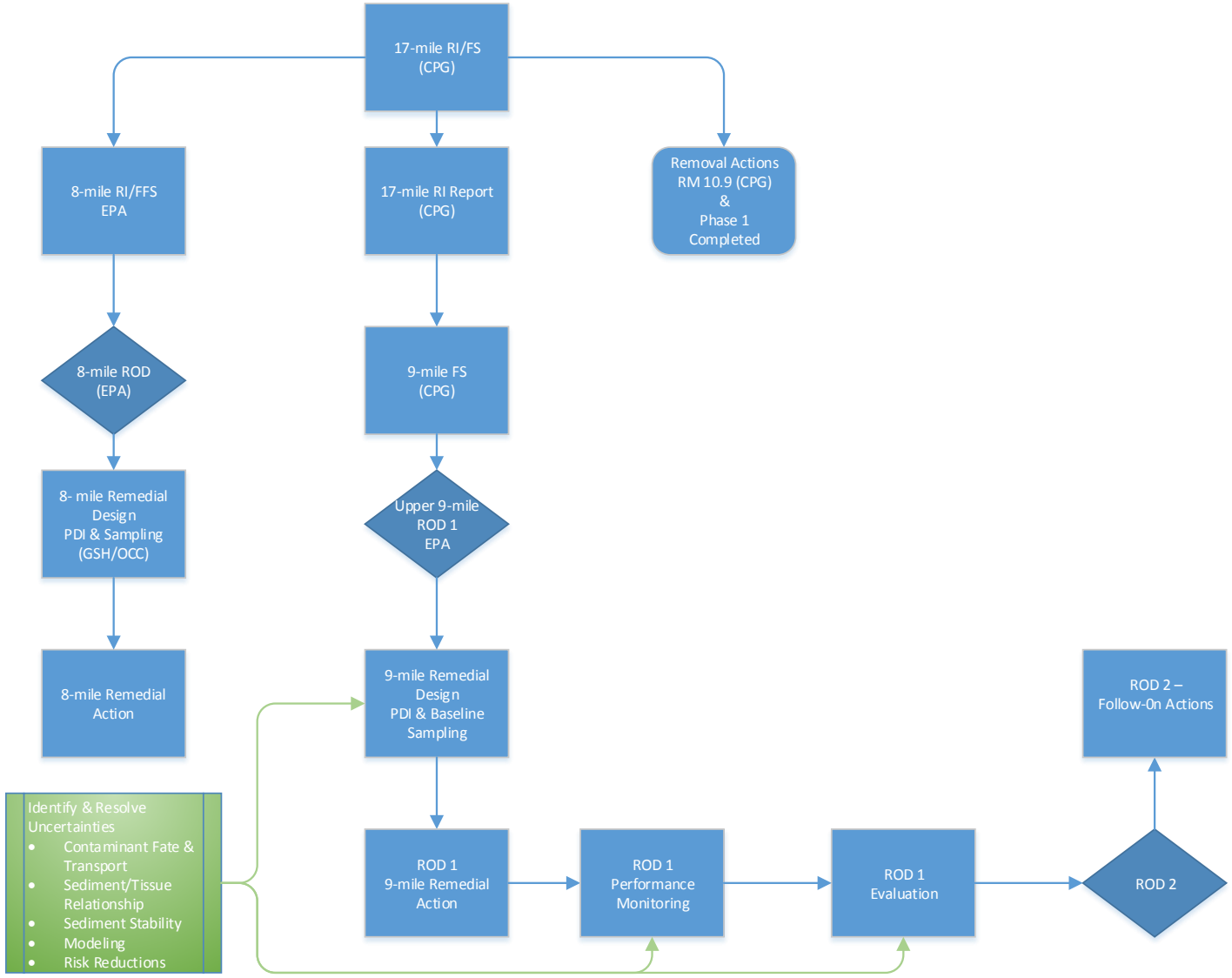
- Objectives that may be identified and addressed within the scope of the performance monitoring plan:
  - Progress Toward Attaining RAOs – Reduction and trends in tissue, water column and sediment COC concentrations, contaminant flux reductions
  - Sediment Stability & Erosion – Evaluate areas with concentrations > RALs in the 0.5-1.5 ft layer, but not targeted because evidence suggests stability or improvement.
  - Uncertainties in the RI where site issues/questions were unresolvable at that time.
- Performance Monitoring Plan would include:
  - Identifying specific key indicators (i.e., monitored parameters that are tied to documenting the performance of the remedial action in meeting RA goals and satisfying RAOs).
  - Selecting criteria values (i.e., concentrations and timeframes) that might trigger the need for additional action or further investigation, and
  - Specifying the possible specific actions that would be taken based on attainment or non-attainment of trigger criteria.

Upper 9-mile Plan – An Adaptive & Iterative Approach



2017	2018	2019	2020-2021	2022-2025	2025-2030	NLT 2030

Upper 9-mile Plan



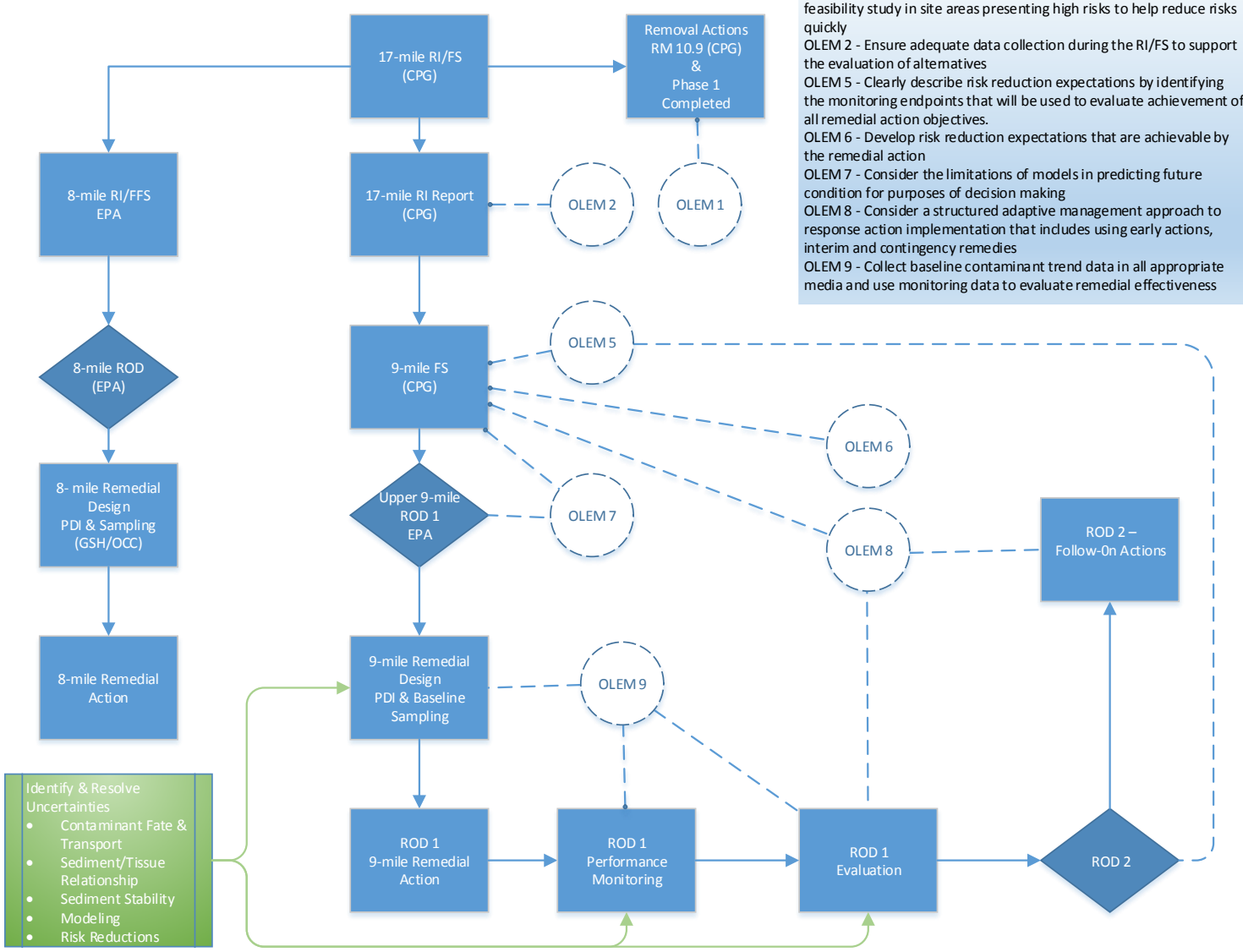
Consistency with EPA's 2005 Sediment Guidance:

- "It also may be appropriate to take other early or interim actions, followed by a period of monitoring, before deciding on a final remedy." (p 2-22)
- "Project managers are encouraged to use an adaptive management approach, especially at complex sediment sites to provide additional certainty of information to support decisions. In general, this means testing of hypotheses and conclusions and reevaluating site assumptions as new information is gathered." (p 2-22)
- "Phasing in remedy selection and implementation may be especially useful at sites where contaminant fate and transport processes are not well understood or the remedy has significant implementation uncertainties." (p 2-21 to 22)
- "Consider separating the management of source areas from other, less concentrated areas by establishing separate operable units (OUs) for the site" (p 2-22)

Consistency with 2017 OLEM Recommendations:

1. Consider early actions during the remedial investigation/feasibility study in site areas presenting high risks to help reduce risks quickly
2. Ensure adequate data collection during the RI/FS to support the evaluation of alternatives.
5. Clearly describe risk reduction expectations by identifying the monitoring endpoints that will be used to evaluate achievement of all remedial action objectives .
6. Develop risk reduction expectations that are achievable by the remedial action
7. Consider the limitations of models in predicting future condition for purposes of decision making
8. Consider a structured adaptive management approach to response action implementation that includes using early actions, interim and contingency remedies
9. Collect baseline contaminant trend data in all appropriate media and use monitoring data to evaluate remedial effectiveness

Upper 9-mile Plan



OLEM Directive January 2017 Recommendations

OLEM 1 -. Consider early actions during the remedial investigation/ feasibility study in site areas presenting high risks to help reduce risks quickly

OLEM 2 - Ensure adequate data collection during the RI/FS to support the evaluation of alternatives

OLEM 5 - Clearly describe risk reduction expectations by identifying the monitoring endpoints that will be used to evaluate achievement of all remedial action objectives.

OLEM 6 - Develop risk reduction expectations that are achievable by the remedial action

OLEM 7 - Consider the limitations of models in predicting future condition for purposes of decision making

OLEM 8 - Consider a structured adaptive management approach to response action implementation that includes using early actions, interim and contingency remedies

OLEM 9 - Collect baseline contaminant trend data in all appropriate media and use monitoring data to evaluate remedial effectiveness

Consistency with the July 2017 Superfund Task Force Recommendations

- Goal 1 – Strategy 2: Promote the application of adaptive management at complex sites and expedite cleanup through use of early/interim rods and removal actions
  - RECOMMENDATION 3: Broaden the Use of Adaptive Management (AM) at Superfund Sites
- Goal 1 - Strategy 3: Clarify policies/guidance to expedite remediation
  - RECOMMENDATION 5: Clarify priorities for RI/FS resources and encourage performing interim/early actions during the RI/FS process to address immediate risks

Responses to EPA's July 24, 2017 Questions

Items to be Discussed after Lunch

- Does EPA share the CPG's goals?
- Does EPA agree that it makes sense to pursue proposed Upper 9-mile Plan?
- Will EPA commit to a process to work with the CPG on a firm, condensed timeframe to expedite the RI/FS for completion by 2018 and identify a remedial action that employs a phased, adaptive management approach?
- Agenda topics for next meeting
  - FS Process & Deliverables
  - Accelerated Project Schedule
  - Project Milestones

Additional Upper 9-mile Maps

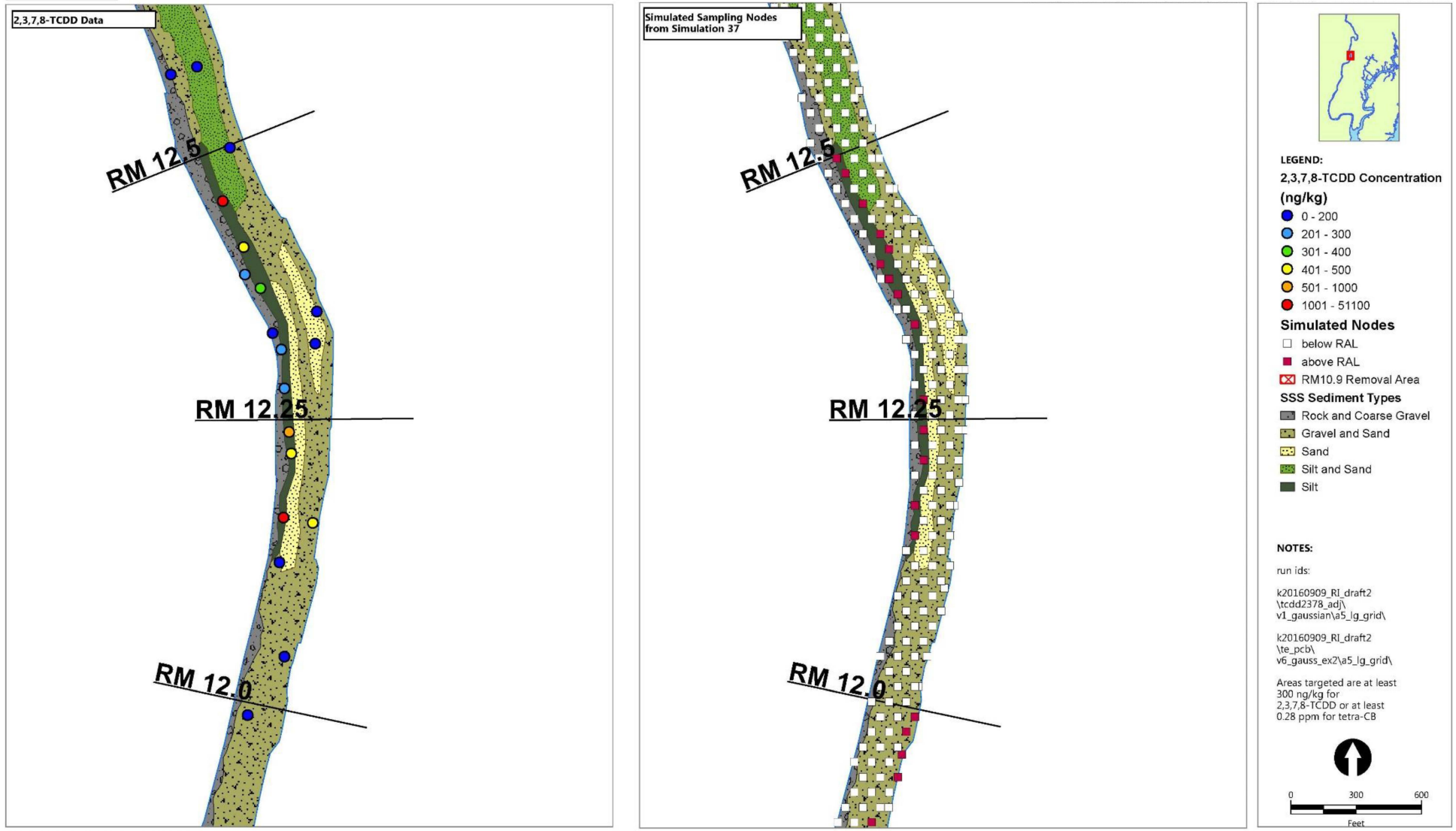


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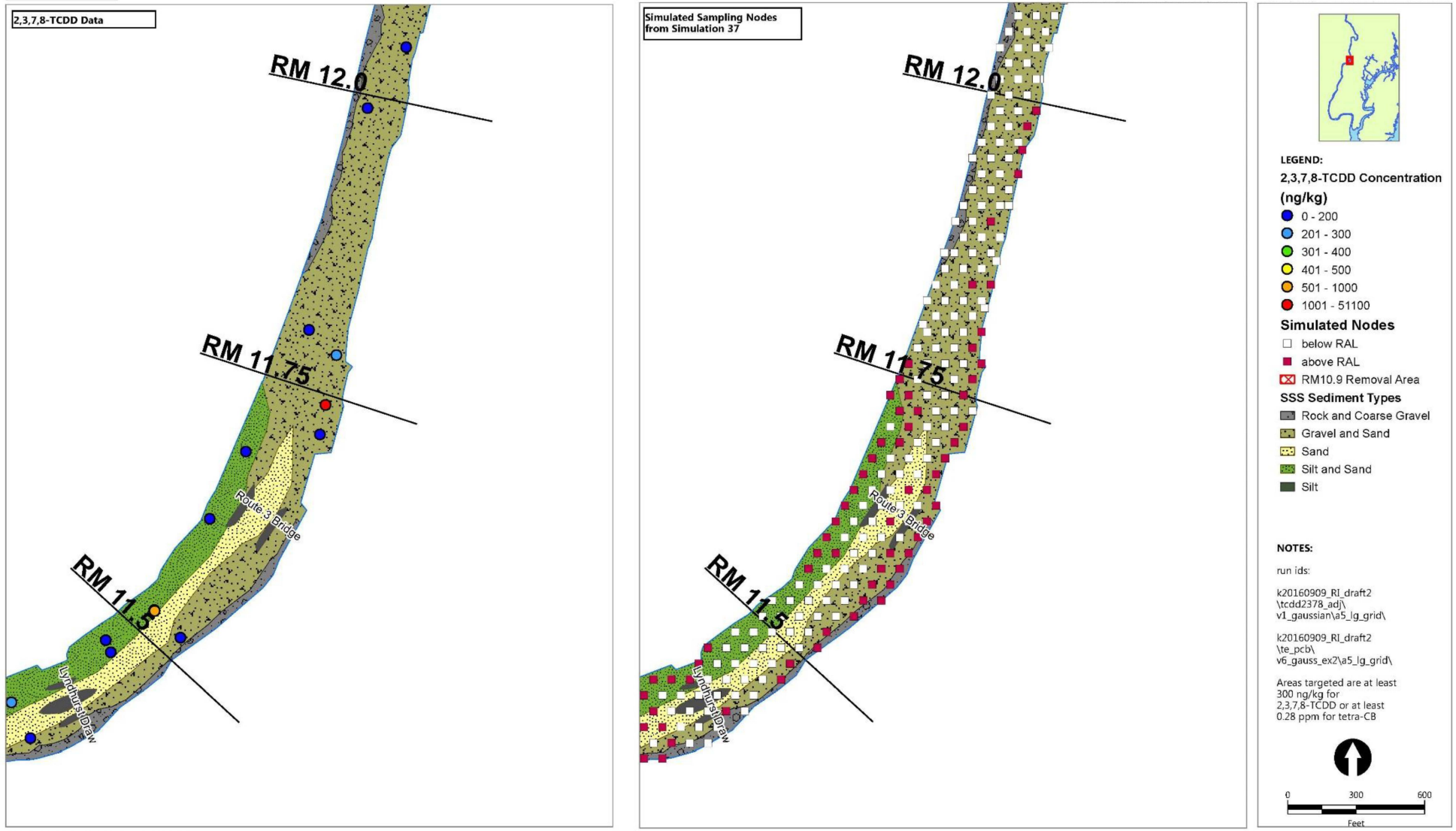
Figure 4.2.1-2k
Surface Sediment 2,3,7,8 TCDD Data Compared to CS 37 Simulated Sampling Nodes



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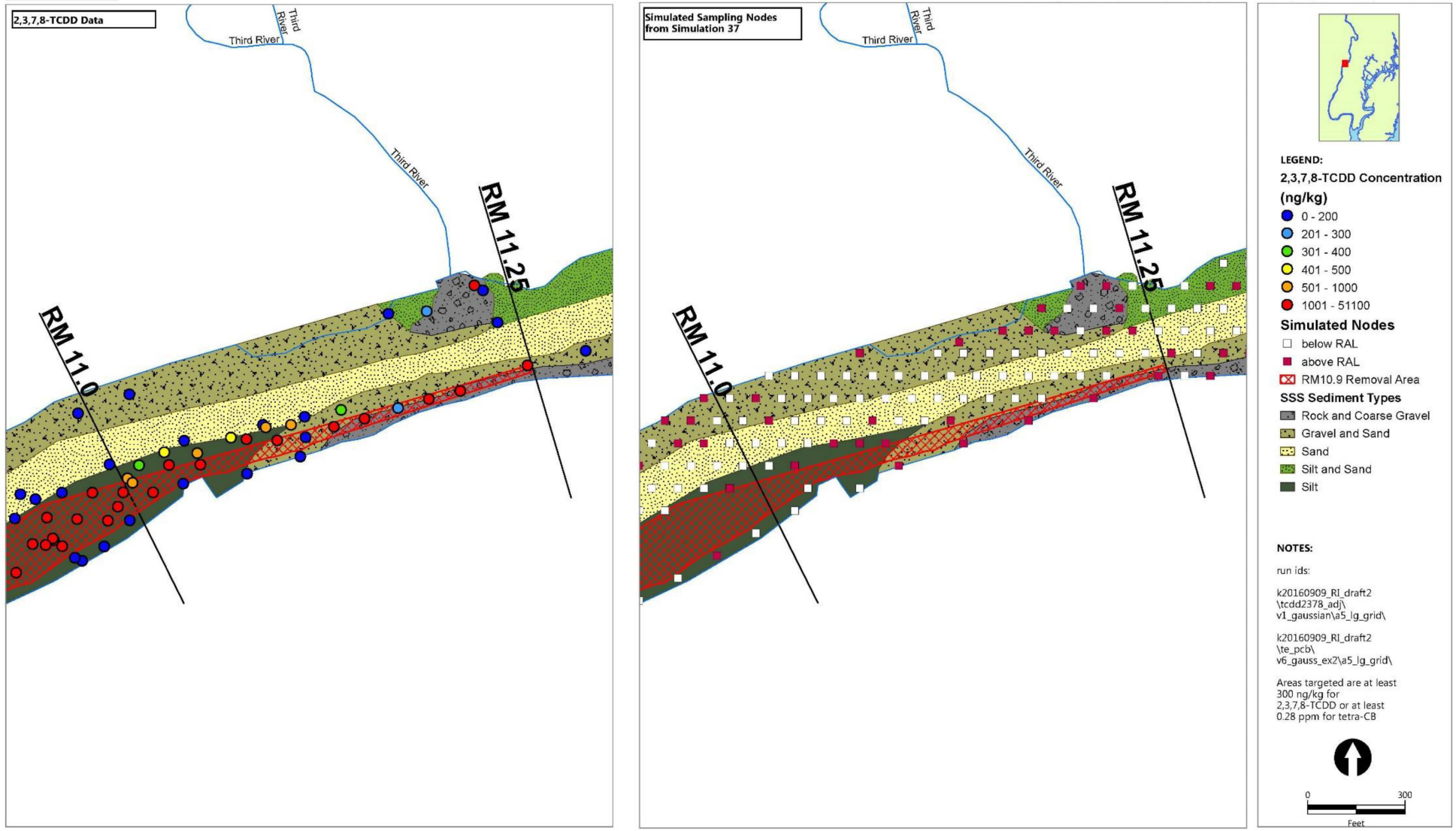

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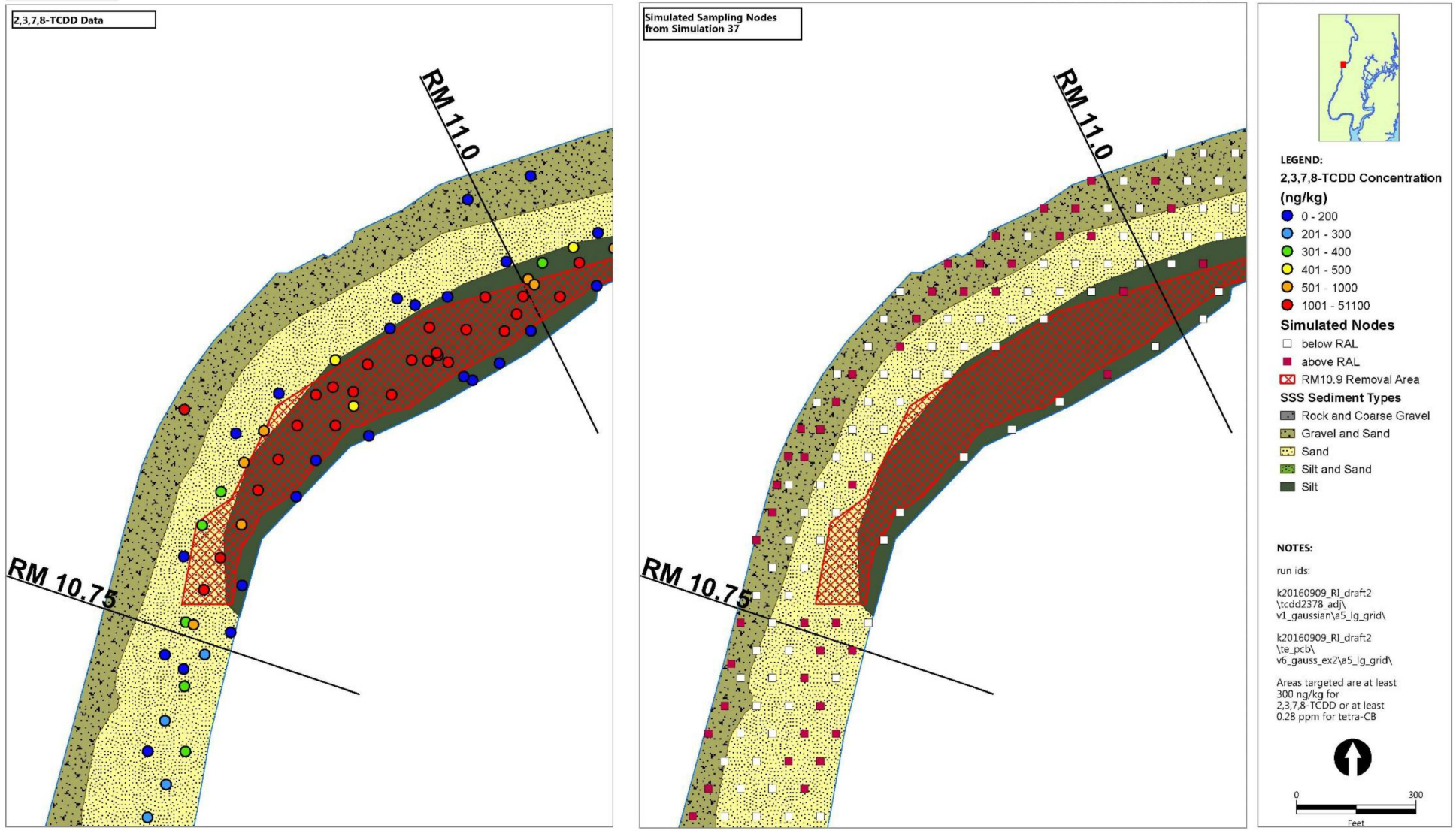

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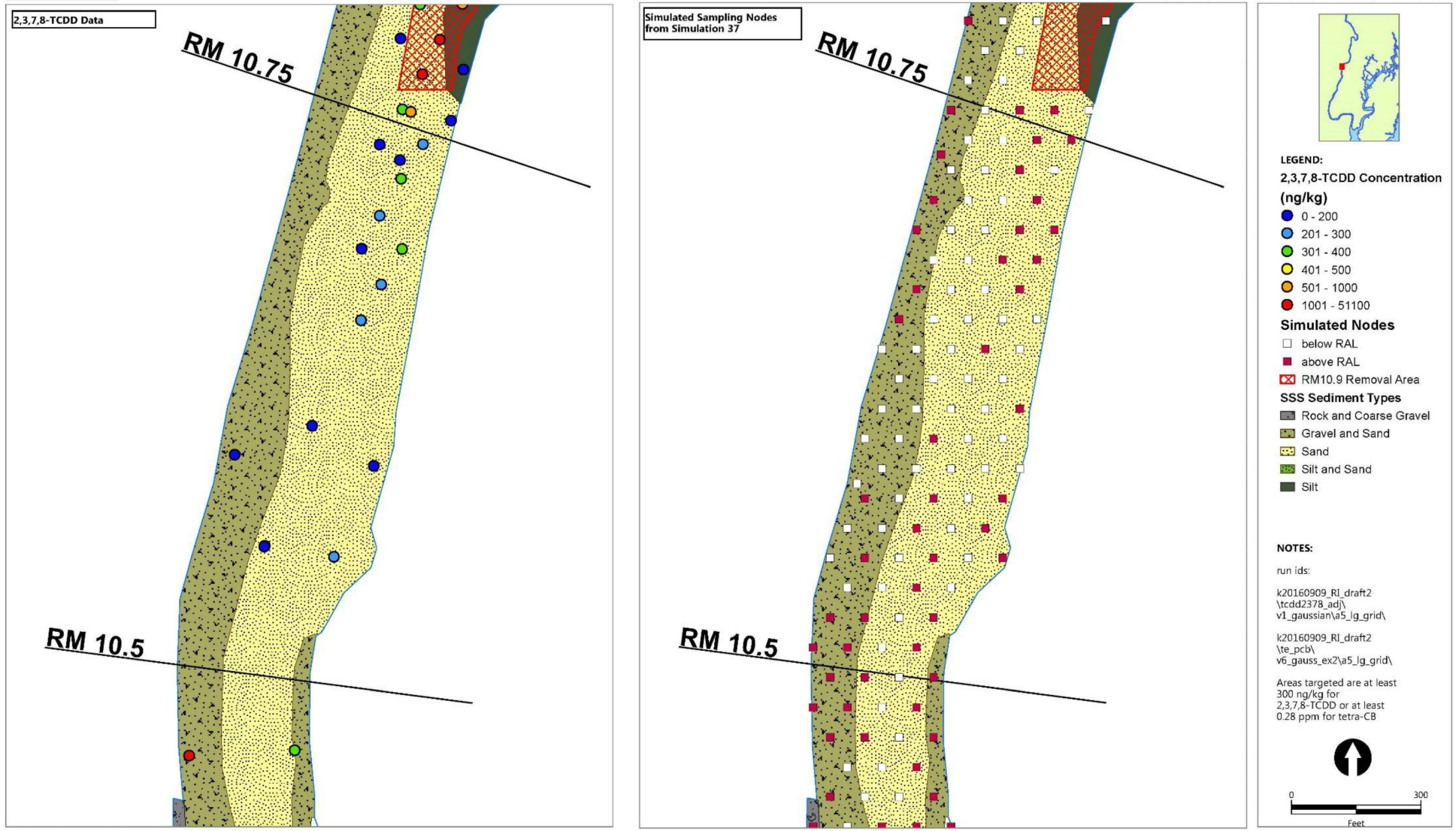

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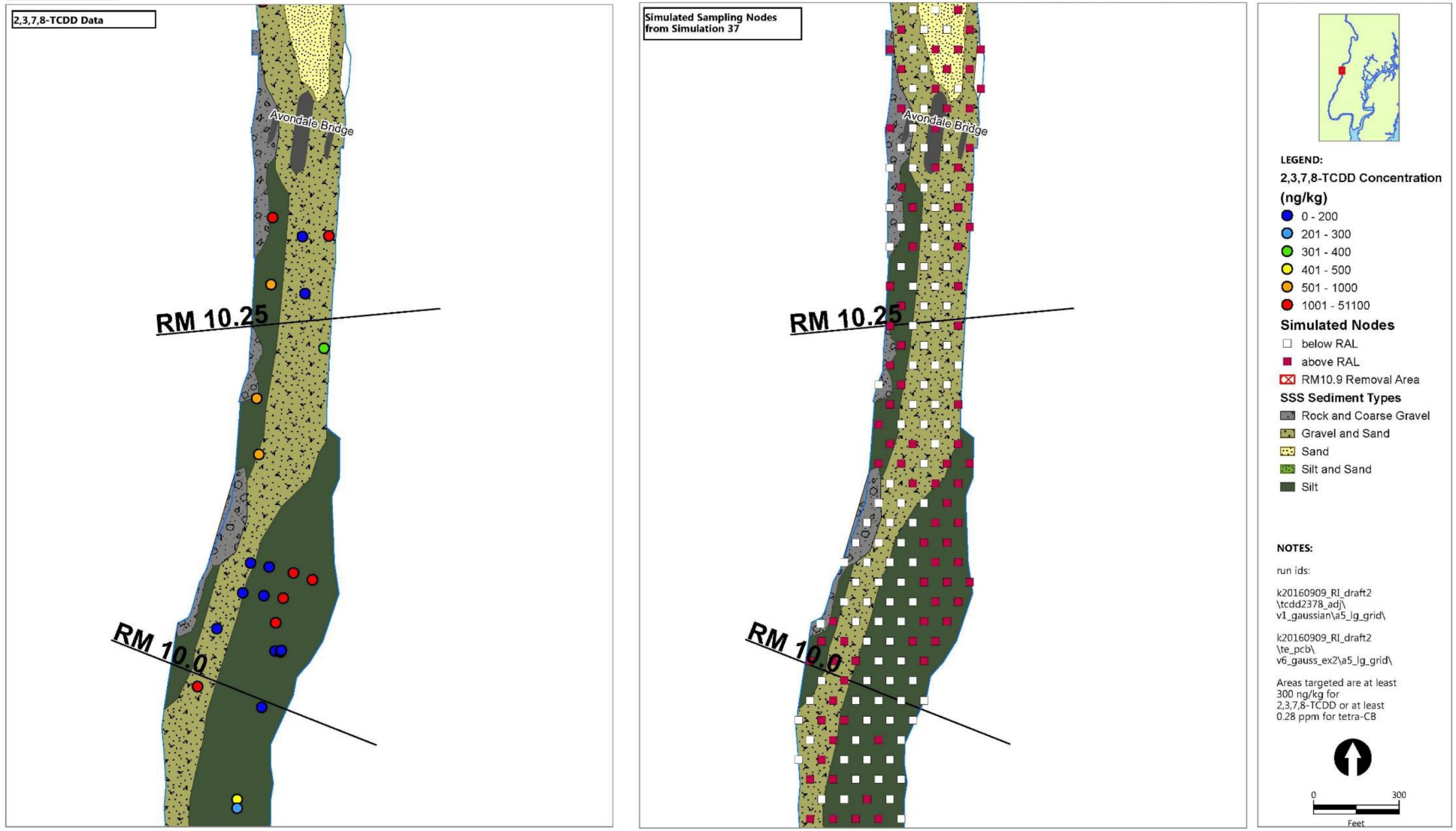

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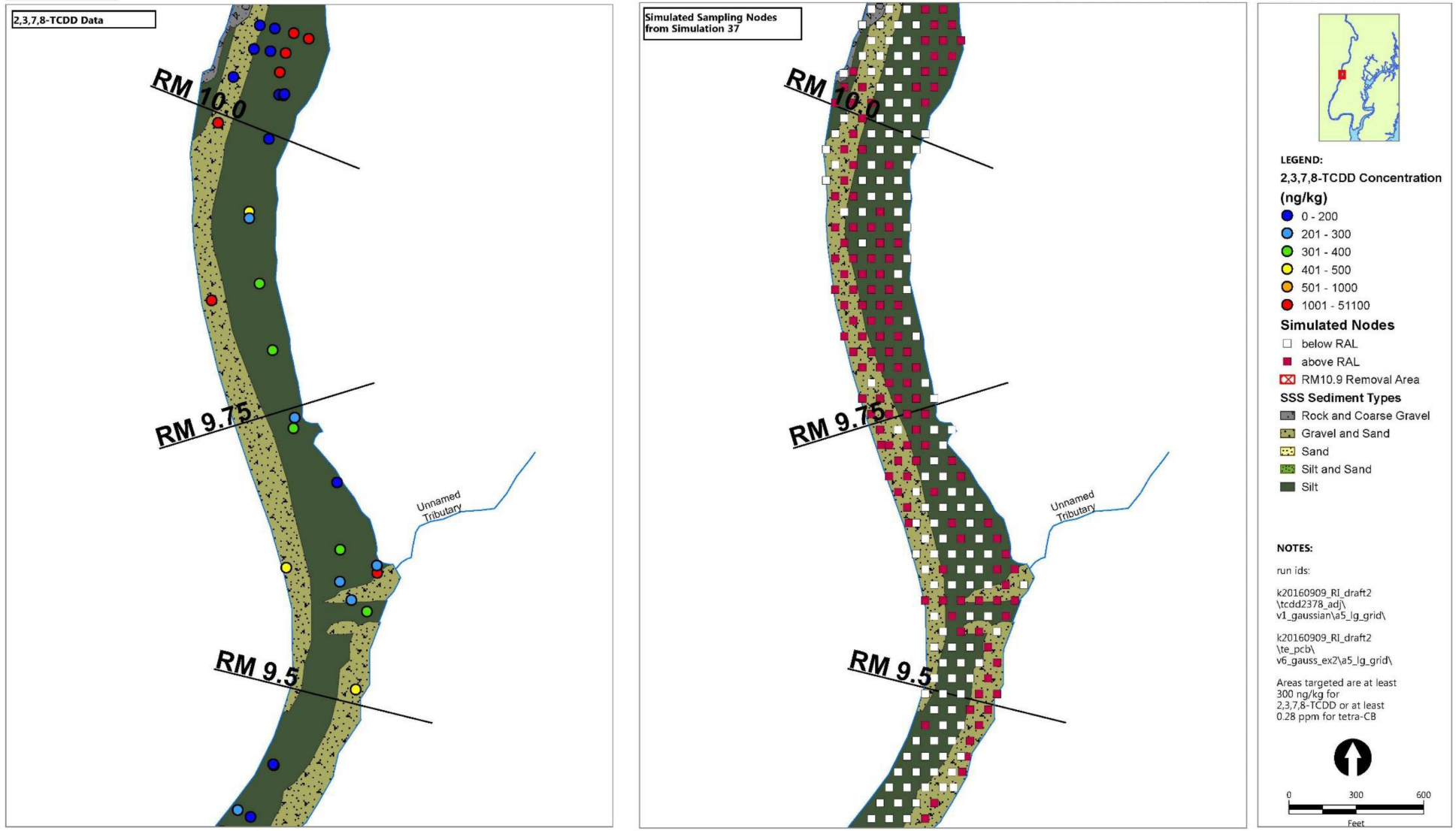

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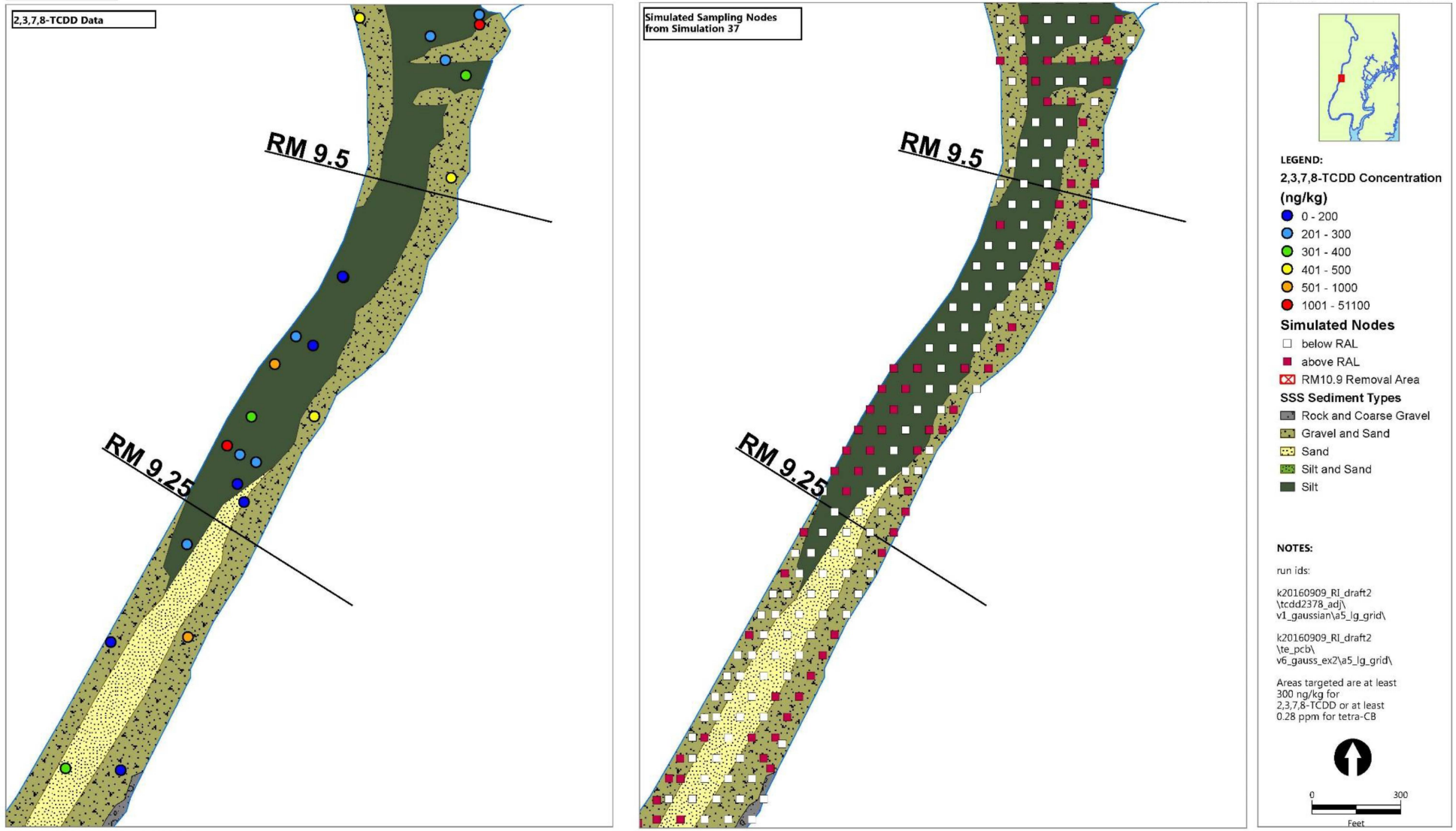
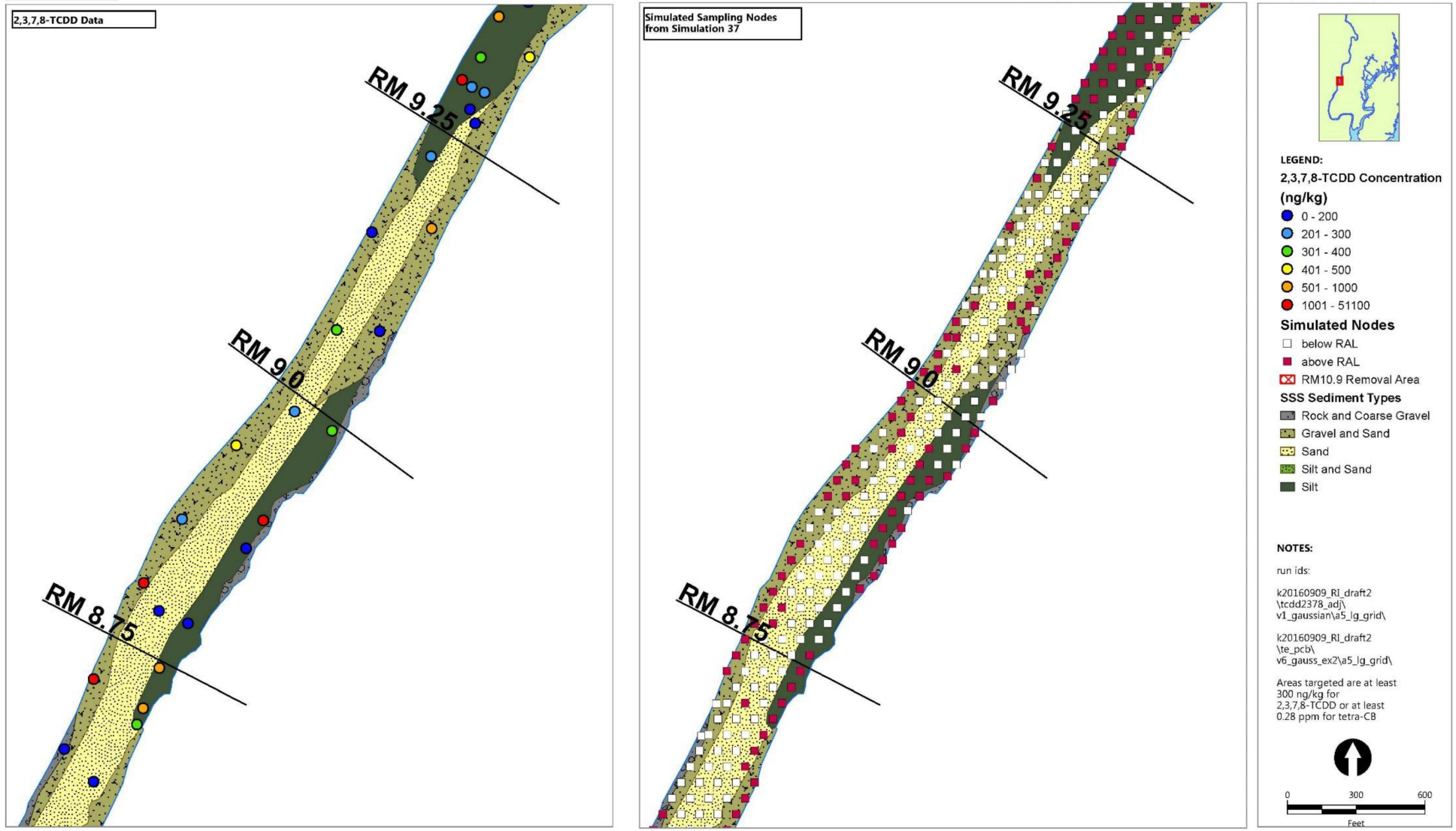
Figure 4.2.1-2s
Surface Sediment 2,3,7,8 TCDD Data Compared to CS 37 Simulated Sampling Nodes



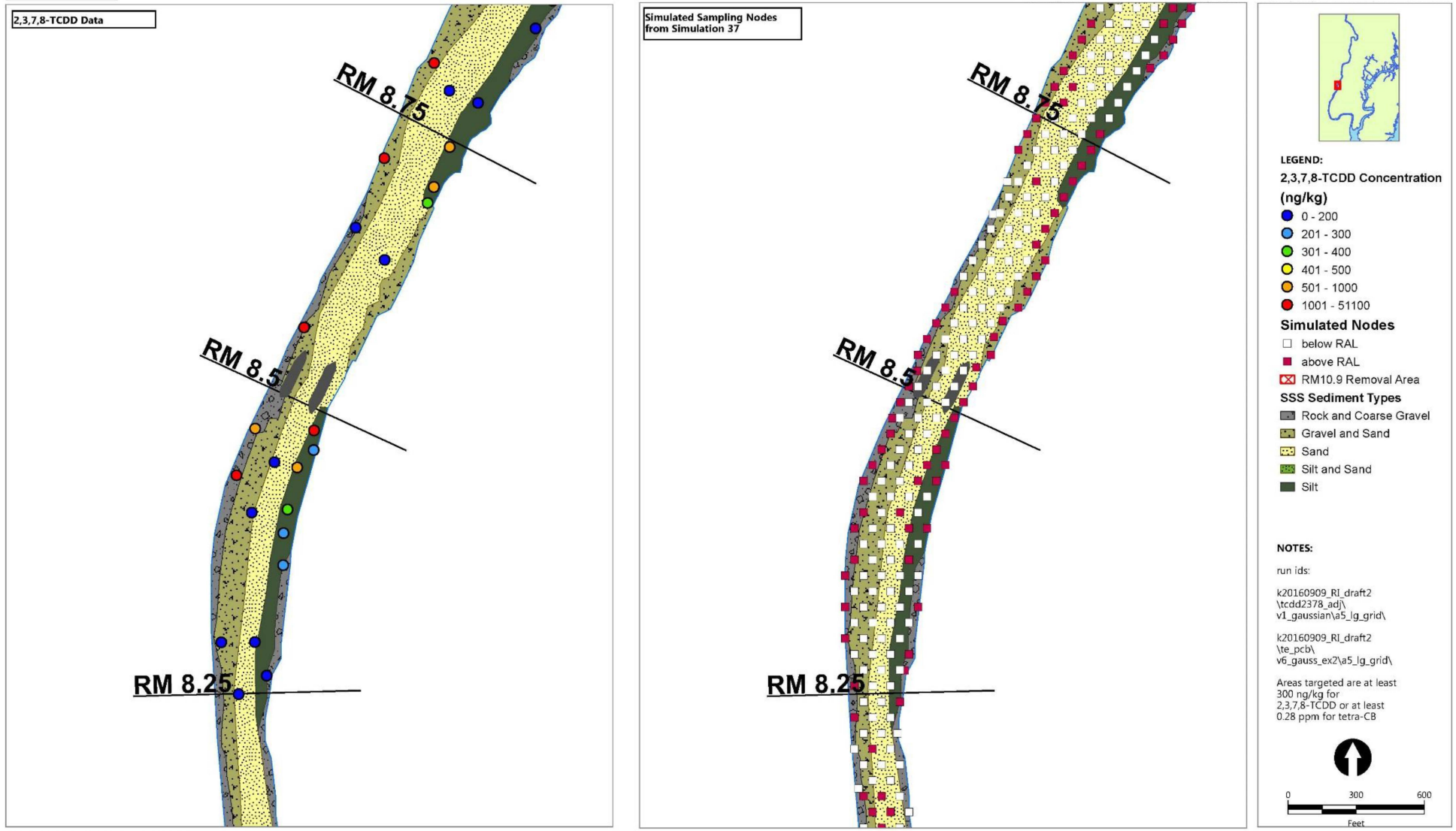
Publish Date: 2017/08/15, 8:48 PM | User: athorvaldson
Filepath: H:\Passaic_CPG\ANALYSIS\Sed_Char\Interpolations\k20160909_RI_draft2\maps\tcdd2378_adj\v1_gaussian\a5_lg_grid\2_panel_center-point_dots_TCDD_SSS_v2.mxd

Figure 4.2.1-2t
Surface Sediment 2,3,7,8 TCDD Data Compared to CS 37 Simulated Sampling Nodes



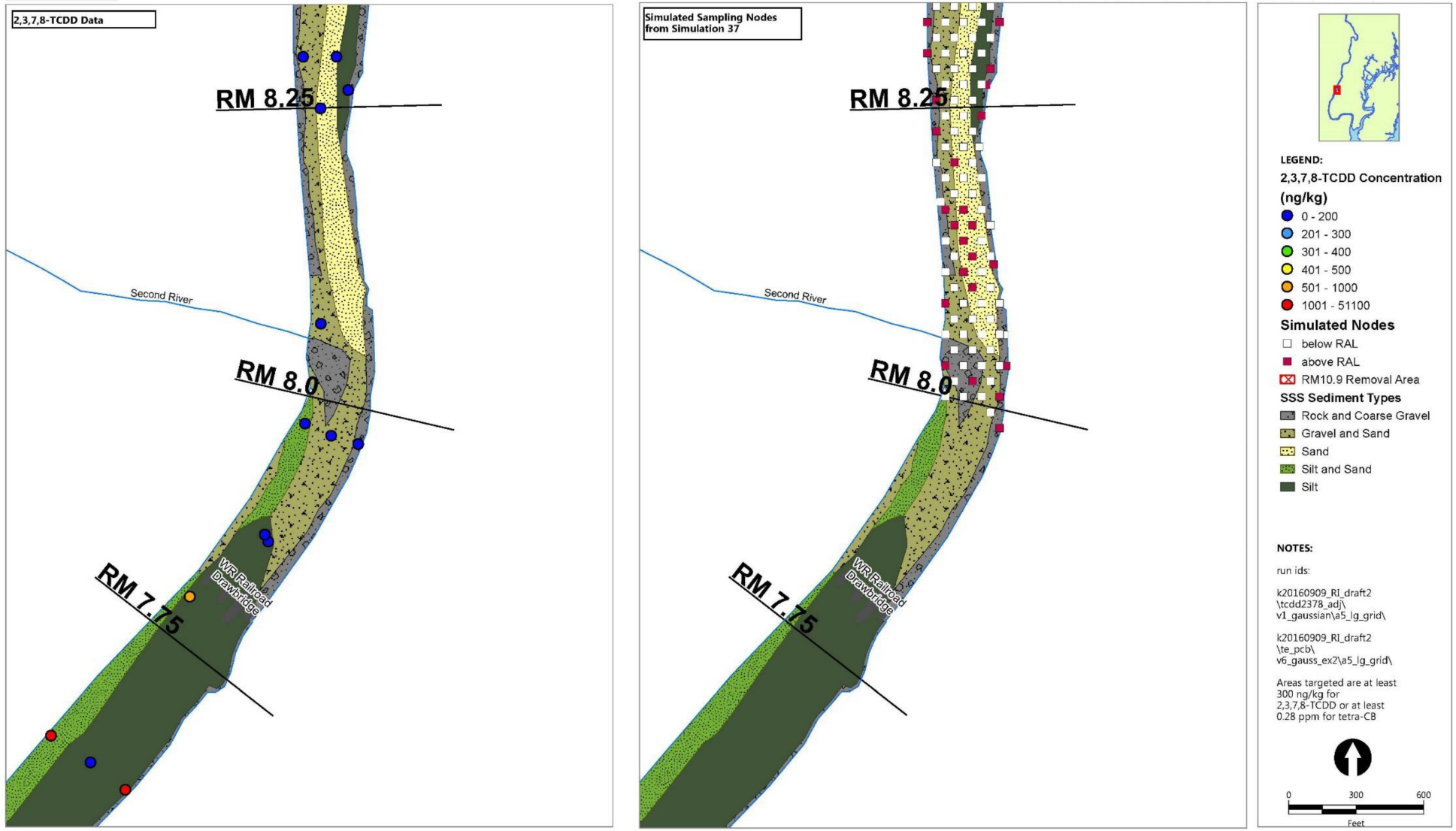
Publish Date: 2017/08/15, 8:48 PM | User: athorvaldson
Filepath: H:\Passaic_CPG\ANALYSIS\Sed_Char\Interpolations\k20160909_RI_draft2\maps\tcdd2378_adj\v1_gaussian\a5_lg_grid\2_panel_center-point_dots_TCDD_SSS_v2.mxd

Figure 4.2.1-2u
Surface Sediment 2,3,7,8 TCDD Data Compared to CS 37 Simulated Sampling Nodes



Publish Date: 2017/08/15, 8:48 PM | User: athorvaldson
Filepath: H:\Passaic_CPG\ANALYSIS\Sed_Char\Interpolations\k20160909_RI_draft2\maps\tcdd2378_adj\v1_gaussian\a5_lg_grid\2_panel_center-point_dots_TCDD_SSS_v2.mxd

Figure 4.2.1-2v
Surface Sediment 2,3,7,8 TCDD Data Compared to CS 37 Simulated Sampling Nodes



Publish Date: 2017/08/15, 8:48 PM | User: athorvaldson
Filepath: H:\Passaic_CPG\ANALYSIS\Sed_Char\Interpolations\k20160909_RI_draft2\maps\tcdd2378_adj\v1_gaussian\a5_lg_grid\2_panel_center-point_dots_TCDD_SSS_v2.mxd

Figure 4.2.1-2w
Surface Sediment 2,3,7,8 TCDD Data Compared to CS 37 Simulated Sampling Nodes